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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/327,469	06/08/1999	SHUNPEI YAMAZAKI	0756-1982	5465

31780 7590 01/29/2003

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EXAMINER

PERALTA, GINETTE

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 01/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/327,469

Applicant(s)

YAMAZAKI, SHUNPEI

Examiner

Ginette Peralta

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-13 and 20-23 is/are pending in the application.
- 4a) Of the above claim(s) 4 and 5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,3,6-13 and 20-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2-3, 6-13, and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (U. S. Pat. 5,830,784) in view of Zhang et al. (U. S. Pat. 5,569,610) and Noguchi et al. (U. S. Pat. 5,869,803).

Zhang et al. ('784) discloses in figs. 3A to 3D a method of manufacturing a semiconductor device that comprises forming a semiconductor film 205 over a substrate, holding a catalytic element (col. 10, ll. 20-24) that promotes the crystallization of the semiconductor film in contact with the semiconductor film, irradiating a laser beam to the semiconductor film to crystallize the semiconductor film, patterning the semiconductor film to form at least a first semiconductor island after the irradiation of the laser beam and forming a first thin film transistor using the semiconductor island.

With regards to the limitation of a pixel matrix circuit comprising the first thin film transistor and a driver circuit comprising the second thin film transistor, this would not be given any patentable weight as it has been held that to be entitled to weight in method claims, the recited-structure limitations therein must affect the

method in a manipulative sense, and not to amount to the mere claiming of a use of a particular structure. Ex parte Pfeiffer, 1962 C.D. 408 (1961).

Zhang et al. ('784) discloses the claimed invention with the exception of holding the catalytic element in contact with an entire surface of the semiconductor film, the laser beam shaped in a rectangle or a square, and the irradiation area of the laser beam.

Zhang et al. ('610) teaches a method of manufacturing a semiconductor device that comprises forming a semiconductor film, holding a catalytic element which promotes the crystallization of the semiconductor film in contact with the entire surface of the semiconductor film, irradiating a laser beam; wherein the laser energy density of the laser beam is 200 to 500 mJ/cm² and is used for the disclosed intended purpose of promoting crystallization of an amorphous area.

Noguchi et al. teaches a method of promoting crystallization of a silicon layer that includes a laser beam shaped as a square or rectangle as shown in Figs. 1 and 2, having an irradiation area of 36 cm² or more, and wherein the silicon substrate is irradiated for the disclosed intended purpose of promoting crystallization.

Thus, it would have been obvious to one of ordinary skill in the art to vary the ranges of the properties of the laser beam in order to obtain a faster crystallization or a more defined crystallization without any unexpected results. Furthermore, it would have been obvious to use a laser apparatus with the capability of having an irradiation area of 10 cm² or more, as it would have been obvious to one of ordinary skill in the art at the time the invention was made to use varying areas of irradiation in order to find the optimum area of irradiation, since it has been held that where the general conditions

of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. And furthermore as Noguchi et al. teaches that the use of this irradiation areas are well known in the art.

1. Claims 6-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (U. S. Pat. 5,830,784) in view of Zhang et al. (U. S. Pat. 5,569,610), Otani et al. (JP 9312260A) and Noguchi et al. (U. S. Pat. 5,869,803).

Zhang et al. ('784) discloses in figs. 3A to 3D a method of manufacturing a semiconductor device that comprises forming a semiconductor film 205 over a substrate, holding a catalytic element (col. 10, ll. 20-24) that promotes the crystallization of the semiconductor film in contact with the semiconductor film, irradiating a laser beam to the semiconductor film to crystallize the semiconductor film, patterning the semiconductor film to form at least a first semiconductor island after the irradiation of the laser beam and forming a first thin film transistor using the semiconductor island.

With regards to the limitation of a pixel matrix circuit comprising the first thin film transistor and a driver circuit comprising the second thin film transistor, this would not be given any patentable weight as it has been held that to be entitled to weight in method claims, the recited-structure limitations therein must affect the method in a manipulative sense, and not to amount to the mere claiming of a use of a particular structure. Ex parte Pfeiffer, 1962 C.D. 408 (1961).

Zhang et al. ('784) discloses the claimed invention with the exception of holding the catalytic element in contact with an entire surface of the semiconductor film; the laser beam shaped in a rectangle or a square; the irradiation area of the laser beam; a

step of conducting a thermal oxide processing in an oxide atmosphere; and, gettering the catalytic element by the addition of phosphorus or boron or through the oxide layer, and disclosing the irradiation area, and laser energy density of the laser beam.

Zhang et al. ('610) teaches a method of manufacturing a semiconductor device that comprises forming a semiconductor film, holding a catalytic element which promotes the crystallization of the semiconductor film in contact with the entire surface of the semiconductor film, irradiating a laser beam; wherein the laser energy density of the laser beam is 200 to 500 mJ/cm² and is used for the disclosed intended purpose of promoting crystallization of an amorphous area.

Noguchi et al. teaches a method of promoting crystallization of a silicon layer that includes a laser beam shaped as a square or rectangle as shown in Figs. 1 and 2, having an irradiation area of 36 cm² or more, and wherein the silicon substrate is irradiated for the disclosed intended purpose of promoting crystallization.

Thus, it would have been obvious to one of ordinary skill in the art to vary the ranges of the properties of the laser beam in order to obtain a faster crystallization or a more defined crystallization without any unexpected results. Furthermore, it would have been obvious to use a laser apparatus with the capability of having an irradiation area of 10 cm² or more, as that is just a matter of choosing equipment and preference and as Noguchi et al. teaches that the use of this irradiation areas are well known in the art.

Otani et al. teaches a method of manufacturing a semiconductor device that comprises a metal element film which promotes crystallization being introduced into an

amorphous silicon, the silicon film is crystallized by a heat treatment, then a second heat treatment is performed in an oxidizing atmosphere and the metal element is removed or reduced, then the thermal oxidation film is removed and a thermal oxidation film is formed on the surface of the silicon film for the disclosed intended purpose of promoting silicon crystallization.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform a thermal oxidation treatment as Otani et al. teaches for the removal of the crystallization promoting element, and that it would be an inherent result of the annealing after the doping with phosphorus or boron that the crystallization promoting element will go through a gettering process and will be removed from the crystallized silicon layer.

Response to Arguments

3. Applicant's arguments filed 11/25/02 have been fully considered but they are not persuasive.

Regarding Applicant's argument that neither of Zhang '784 nor Zhang '610 disclose a pixel matrix circuit or forming a TFT of a pixel matrix circuit, it is noted that it has been held that to be entitled to weight in method claims, the recited-structure limitations therein must affect the method in a manipulative sense, and not to amount to the mere claiming of a use of a particular structure. *Ex parte Pfeiffer*, 1962 C.D. 408 (1961).

With regards to Applicant's argument that the feature of gettering the catalytic element to the added region by conducting a heat treatment to remove or reduce the

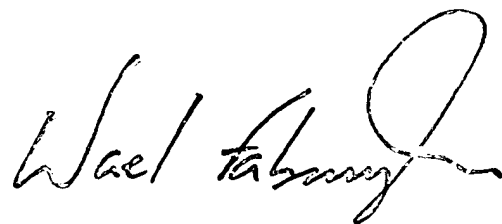
catalytic element is not conventional, Applicant is directed to Wolf, *Silicon Processing for the VLSI Era, Volume 1*, where it is disclosed an example of gettering of gold atoms in silicon by phosphorus diffusion, where after the impurity is present in the substrate, a phosphorus diffusion is performed for the disclosed intended purpose of gettering the gold by the well known mechanism of extrinsic gettering. Thus, extrinsic gettering of ions or impurities utilizing phosphorus, arsenic, boron and other dopants is well known to one of ordinary skill in the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ginette Peralta whose telephone number is (703)305-7722. The examiner can normally be reached on Monday to Friday 8:00 AM-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703)308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

GP
January 27, 2003

A handwritten signature in black ink, appearing to read 'Wael Fahmy', with a large, stylized loop at the end.

SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800